

SHOREBIRDS ALONG THE DELAWARE

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It is the purpose of this paper to give a picture of the average shorebird flight along the Delaware River in the vicinity of Philadelphia under present conditions. Observations during any one year were not numerous enough to draw an accurate picture, so information gathered over the ten years 1936 to 1945 was used to show what can be expected in the way of shorebirds at any good shorebird habitat near Philadelphia.

In this area the numbers of these birds are governed by several variable factors, among them, general weather conditions during the flight, and, most important, the area of suitable habitat. Except for the portion exposed at low tide, the natural flats are covered with wild rice, spatterdock or some other vegetation. This seems to concentrate the birds, especially during high tide, on the filling operations that are being continually carried on. Since about the year 1900, suction dredges have been in continual operation filling river marshes with silt. The dredges are moved from place to place at irregular intervals so naturally the total area of suitable habitat is not constant. When a dredge moves to another location the fill usually dries up or tall vegetation grows in about two months, making it unsuitable for shorebirds. Due to these rapidly changing conditions on the fills, the scarcity of observations, and the fact that only a small percentage of the birds pass through this region, it seems impractical to attempt to predict any minor changes in the status of the respective species, either during the time covered by this survey or in the next few years. However, a general picture of shorebird numbers and river conditions at present should prove interesting for comparison when time has wrought its inevitable changes in years to come.

The writer's counts, mostly made in the vicinity of Westville, N. J. during the years 1941 to 1945, are supplemented by the records of the following members of the D. V. O. C.: Richard Miller for the year 1936 at Richmond, Philadelphia, Pa.; James Rigby for the years 1937 to 1940 and 1945 at Tinicum, Pa.; Robert Haines for years 1937 to 1939 and 1944 and 1945 in vicinity of Delair and Fish House Station, N. J.; and Dale Coman for years 1942 to 1945 at localities from Fish House Station to Salem, N. J.

Observations were made from Delair to Salem on the New Jersey side and at Tinicum and Richmond on the Pennsylvania side of the Delaware River. Included were all types of country found in this area frequented by shorebirds.

Vicinity of Westville, N. J.—About 75% of all trips included in this survey were made in this locality from 1941 to 1945 inclusive. In the area was a filling operation extending for about two miles along the river front, some of the older portions being covered with vegetation and shallow rain water pools. This filling project, having been in progress for more than ten

years, has afforded a continual series of open mud flats where most species congregated. Also in the area was a cultivated field of about nine acres on which tomato refuse was dumped. Golden Plover, Killdeer and Pectoral Sandpipers found this spot attractive. Also included in the territory were several old brushy fields, frequented by singing Woodcock in the spring. A river marsh where Wilson's Snipe were recorded completes the list of localities in the area.

Richmond, Philadelphia, Pa.—Filled in land along the river banks.

Tinicum and Hog Island, Pa.—Large marshy areas and extensive areas of filled in land.

	Rank	Times seen	Largest number one locality one trip	Total number all trips
Greater Yellow-legs	1	60	60	637
Semipalmated Sandpiper	2	12	400	929
Killdeer	3	56	10	201
Spotted Sandpiper	4	26	17	92
Wilson's Snipe	5	25	20	91
Semipalmated Plover	6	5	30	62
Least Sandpiper	7	12	12	60
Woodcock	8	15	7	34
Solitary Sandpiper	9	14	6	31
Lesser Yellow-legs	10	14	5	28
Pectoral Sandpiper	11	2	10	15
Red-backed Sandpiper	12	2	6	8
Black-bellied Plover	13	3	2	4
Western Sandpiper	14	2	2	3
Turnstone	15	1	1	1
Upland Plover	15	1	1	1
Dowitcher	15	1	1	1

FIGURE 1A. Ranking of shore birds along Delaware River from 1936 to 1945. Northward flight.

Delair, N. J.—An extensive filling operation partially completed.

Fish House Station, N. J.—A large river cove that at low tide forms extensive open mud flats.

Bridgeport, N. J.—Partially filled land covered by water at high tide.

Pedricktown, N. J.—Wild rice marsh along Oldman's Creek.

Salem, N. J.—Wild rice marsh along Salem Creek.

Fort Mott, N. J.—Observations made while a very large filling operation was in progress.

The tables ranking the shorebirds (Figure 1) were compiled in a method suggested by Charles Urner in his series of articles "Shorebirds on the New Jersey Coast," *Auk*, 1929 to 1932 and *Proceedings of Linnaean Society*, 1935. Ten years observations were combined to show an average picture. The method is to rank each species in three particulars: (1) number of times seen; (2) largest number seen in one locality in one day; and (3) totals of numbers recorded on all trips. The final rank is an average of these three.

Due to such factors as recounting individuals that linger, rapid changes in the environment on areas under observation and irregularity of trips, the ranking of species is not positively accurate but gives a general idea of their relative abundance along the Delaware. Several species are probably more numerous than Figure 1 indicates.

Some of the species that are not usually found on the open mud flats, such as Wilson's Snipe and Woodcock, being more difficult to find, were

	Rank	Times seen	Largest number one locality one trip	Total number all trips
Semipalmated Sandpiper	1	98	25,000	78,123
Lesser Yellow-legs	2	120	250	3,333
Killdeer	3	134	100	2,293
Pectoral Sandpiper	4	68	100	1,391
Greater Yellow-legs	5	101	73	733
Least Sandpiper	6	45	300	734
Spotted Sandpiper	7	76	20	277
Semipalmated Plover	8	49	50	276
Western Sandpiper	9	21	60	301
White-rumped Sandpiper	10	18	25	184
Stilt Sandpiper	11	26	15	131
Dowitcher	12	19	20	109
Red-backed Sandpiper	13	6	30	110
Solitary Sandpiper	14	42	10	90
Wilson's Snipe	15	21	11	53
Black-bellied Plover	16	21	8	52
Upland Plover	17	4	25	36
Golden Plover	18	7	5	13
Wilson's Phalarope	19	2	9	10
Avocet	20	1	7	7
Sanderling	21	3	3	5
Baird's Sandpiper	22	2	3	4
Hudsonian Curlew	23	1	3	3
Hudsonian Godwit	23	1	3	3
Turnstone	24	1	2	2
Willet	25	1	1	1

FIGURE 1B. Ranking of shore birds along Delaware River from 1936 to 1945. Southward flight.

certainly overlooked many times. In fact, Woodcock were not recorded at all during the summer and fall so are not listed in Figure 1B although they breed locally and linger late into the fall. The only time Woodcock were looked for was in the spring when it was fairly easy to locate them while they perform their flight song at dusk. However, due to the fact that they inhabit a community widely separated from the other species of shorebirds a comparison of their relative abundance (Figure 1A) by the method employed is not as accurate as when used to compare birds frequenting the same habitat, namely the open flats.

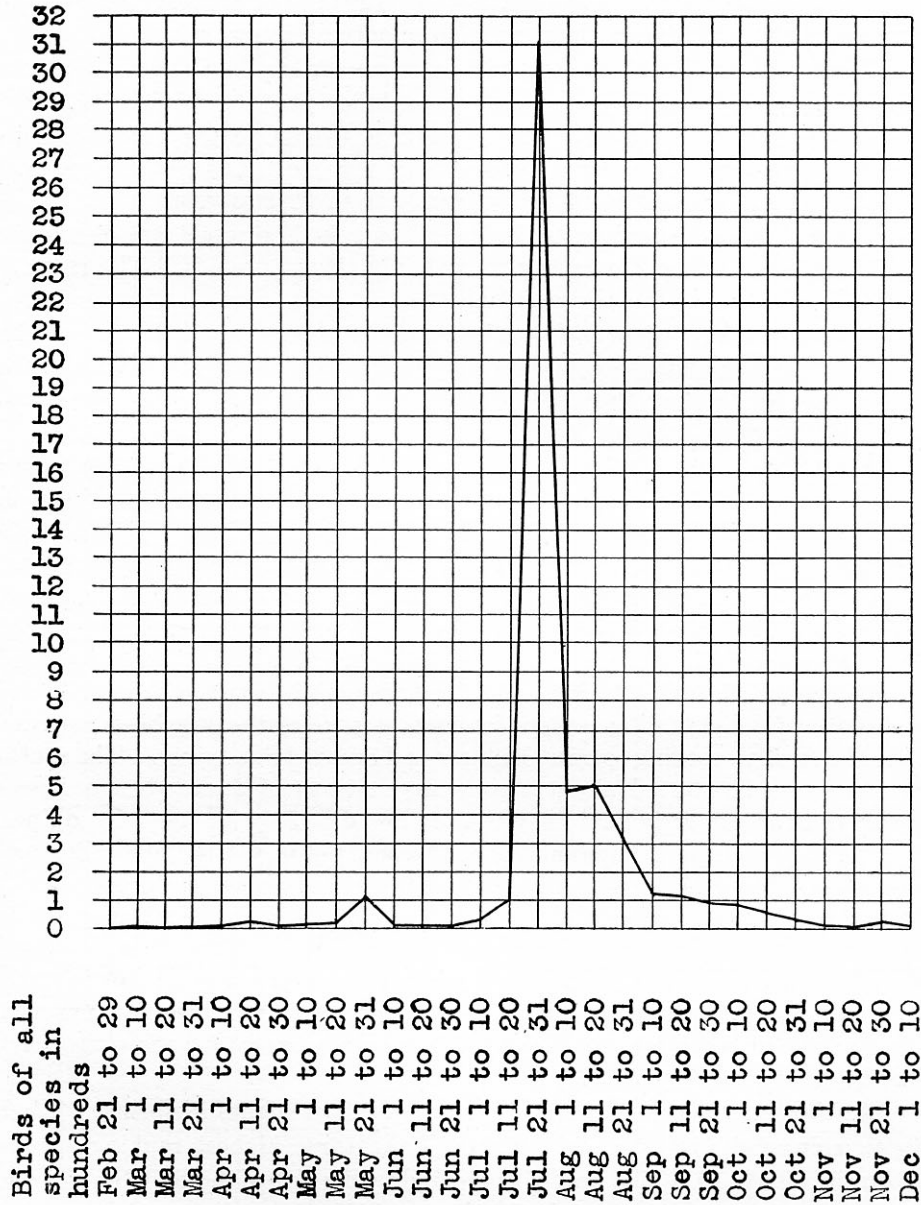


FIGURE 3. Average number of shore birds, of all species, per trip during each ten day period.

Upland Plover breed in at least two localities in the area but few records were available, which gives the species an abnormally low rank.

Western Sandpipers are certainly more numerous than the table shows since many pass through unrecorded due to difficulties of identification.

Of the species listed in Figure 1A, those from Greater Yellow-legs to Lesser Yellow-legs inclusive are of regular occurrence. The rest are unusual and the order of ranking would vary greatly from year to year.

Semipalmated Sandpiper to Upland Plover in Figure 1B are of regular occurrence and Golden Plover is also probably always present. The rest are unusual and are only found occasionally.

In order to show when each species occurs on the river and the time of the peak of its abundance, the year was divided into ten day periods and each observation for the ten years 1936 to 1945 was listed in its respective period. This data appears in Figure 2.

If during any ten day period there were less than three trips when shore-birds were seen the figures for that period were not used in Figure 2 or Figure 3.

The only bird recorded during winter was the Killdeer. Migrant Killdeer appeared in late February. The order of arrival from then on was as follows. March brought Woodcock, Wilson's Snipe and Greater Yellow-legs. The Spotted Sandpiper arrived in April and Solitary Sandpiper early in May. Soon after the Solitary were Least Sandpiper, Semipalmated Sandpiper and Semipalmated Plover. During June there was a lull between the northward and southward flights when, except for a few stragglers, the only birds recorded were the locally breeding species, Killdeer and Spotted Sandpiper. The southward movement started about the twenty-seventh of June when a Lesser Yellow-legs or two arrived. They were followed in July by Least Sandpiper, Greater Yellow-legs, Semipalmated Sandpiper, Solitary Sandpiper, Pectoral Sandpiper, Dowitcher, and Semipalmated Plover in about the order named. August added Black-bellied Plover, Stilt Sandpiper and Western Sandpiper to the list; September, Wilson's Snipe and Golden Plover. There were scattered records of White-rumped Sandpiper through the summer months but in October a real flight developed. Red-backed Sandpipers arrived the same month. The southward migration ended early in November, except for a few stragglers that lingered into December.

As shown in Figure 3 there were three distinct flights in spring. These flights coincided with the main flights of the three highest ranking species shown in Figure 1A. The first of these flights, occurring the first ten days of March, represents the peak of the Killdeer and Woodcock flights with an average of 5.5 individuals per trip. Next is a flight during the period April 11-20 with an average of 25.2 individuals per trip, 87% being Greater Yellow-legs. May 21-31 produced the third and greatest flight of the northward migration when an average of 109 individuals per trip were recorded, 86% being Semipalmated Sandpipers.

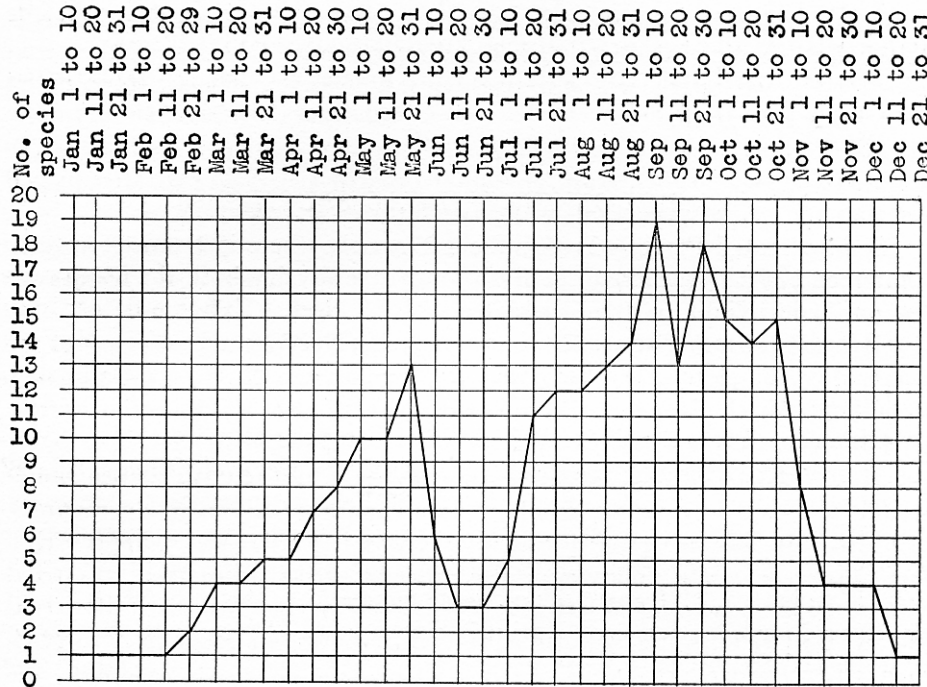


FIGURE 4. Number of species recorded during each ten day period.

Figure 4 shows that during the northward flight the period May 21-31 also produced the peak in numbers of species recorded.

There was a gradual increase of birds through the first twenty days of July as the southward migration started. During the next ten days, July 21-31, the average number of individuals seen per trip climbed from 97.9 to the amazing peak of 3,112.6, Semipalmated Sandpipers accounting for 98% of the figure. Numbers sharply declined during the next period to the average of 485 per trip, held through the middle period of August, and then declined steadily until the migration was ended. While the last ten days of July brought the peak of volume, it will be noted that the greatest number of species per period occurred during September (Figure 4) when the average number of individuals per trip was only a little over one hundred.

It can be seen that the northward flight does not begin to approach the southward flight in volume. There are several reasons for this vast difference in numbers: (1) the natural destruction of the surplus population through the fall and winter; (2) the southward flight is stretched out over a longer period because the birds linger; (3) the great bulk of Lesser Yellow-legs, Pectoral Sandpipers, White-rumped Sandpipers and Stilt Sandpipers that pass through this region on the way south use another route on their flight north; (4) most

birds that prefer the salt water probably rest on the coastal marshes immediately before starting inland to their breeding grounds. Because of the proximity of this area to the coast they pass over this region without stopping on their spring migration.

NOTES ON INDIVIDUAL SPECIES

Semipalmated Plover—Prefers the salt marsh, where it is most common, but is found every year along the fresh water river during both the northward and southward flight. Often associates with Killdeer. Extreme dates: May 13 to May 24; July 22 to Oct. 27. Largest flocks: Northbound—12 on May 14, 30 on May 17, 15 on May 24; Southbound—15 on Aug. 31, 50 on Sept. 4, 30 on Sept. 15.

Killdeer—The only shore bird recorded the year round on this survey. Richard Miller, after 49 years of observation in the Delaware Valley, lists 42 December records, 11 January records and 32 February records. During the breeding season it prefers the upland cultivated fields but on migration is common on the river flats. Extreme dates for supposedly migrating birds: Feb. 24 to Dec. 5. Largest flocks: Northbound—5 on March 8, 10 on March 19, 10 on March 26 and 5 on April 27; Southbound—80 on Sept. 26, 100 on Sept. 29 and 83 on Oct. 8.

Golden Plover—Only found during the southward migration when it was in cultivated fields with Killdeer. Probably prefers the upland to salt marsh or river mud flats. Extreme dates during this survey: Sept. 12 to Sept. 26. However, Potter recorded one Aug. 29, 1932 and Street another on Nov. 3, 1935. Largest flocks: 5 on Sept. 12 and 3 on Sept. 26.

Black-bellied Plover—Rarely found during the northward flight but regular during the southward on the river flats and occasionally in cultivated fields. Prefers the salt marsh where it is most common. Extreme dates: May 20 to June 9; Aug. 6 to Oct. 27. Largest flocks: Northbound—2 on May 20; Southbound—6 on Aug. 23, 6 on Sept. 27 and 8 on Oct. 10.

Ruddy Turnstone—Strictly a salt water bird, found rarely on the river, but never lingers. Recorded once in the spring, May 30, 1940; and once in the fall, 2 on Sept. 23, 1945. Additional records: One Sept. 10, 1929 at Essington (Miller); one May 21, 1919 at Camden, *Cassinia*, 1919, page 33 (Potter).

Woodcock—Although it was not recorded during the summer and fall on this survey it is a regular breeding bird in the swampy woods along the river. Earliest arrival was March 3 and latest record is Nov. 26, 1939 (William Yoder). Highest counts at one locality: 7 singing in one field March 24, and 6 singing in one field March 30.

Wilson's Snipe—Strictly a fresh water bird, found on both the northward and southward flights in grassy marshes. Extreme dates: March 5 to May 31; Aug. 30 to Dec. 2. Fletcher Street recorded one Jan. 2, 1944 at Beverly, N. J.,

(*Cassinia*, 1944, page 38,) which indicates that an occasional bird might winter here. Highest counts at one locality: Northbound—20 on March 23, 6 on April 7, 8 on April 9, 6 on April 11 and 6 on May 5; Southbound—8 on Oct. 7, 14 on Nov. 22 and 6 on Nov. 29.

Hudsonian Curlew—Strictly a salt marsh bird that is seen occasionally along the river but never lingers. Only recorded once during this survey, three on July 27, 1938. Additional records: One at Philadelphia on May 18, 1935, *Cassinia*, 1933 to 1937, page 24 (Matthews); 3 flying over mouth of Pennypack Creek, Philadelphia, Pa. on May 18, 1930 (Miller); one at Collingswood, N. J. on May 17, 1928, *Cassinia*, 1927 to 1928, page 34 (Potter).

Upland Plover—Reported breeding at Philadelphia Airport on the banks of the Delaware River by James Rigby and in vicinity of Pennypack Creek by John T. McNeill, Jr. Neither area was visited with regularity. The species was recorded only once on northward flight and four times during southward flight. Extreme dates for this area from Richard Miller, March 20, 1921 to Oct. 18, 1913. High count—25 on Aug. 15.

Spotted Sandpiper—One of the 4 locally breeding shorebirds. Seems to be equally as common as a transient and breeder on the coast as along the river. No large flights are apparent from the records. Extreme dates: April 7 to Oct. 26. Highest counts at one locality: 17 on May 24, 15 on July 20 and 20 on July 21.

Solitary Sandpiper—Strictly a fresh water species. While many were observed on the fills they are more apt to be found along wooded ponds and streams. Extreme dates from this survey: April 30 to May 24; July 17 to Oct. 22. Extreme dates from other sources: March 26, 1944 (McNeill) to June 8, 1901 (Miller); July 9, 1939 (Miller) to Oct. 27, 1924 (Miller). Largest flocks: Northbound—6 on May 6, 4 on May 10 and 5 on May 14; Southbound—10 on July 23, 5 on Aug. 4, 6 on Aug. 29 and 5 on Sept. 2.

Willet—Strictly a salt marsh bird, breeding on salt marshes of Delaware Bay just south of the region covered by this survey. Only recorded once, one bird July 19, 1941. Additional records: One Aug. 24, 1933 observed by Julian Potter at Fish House, N. J.; a flock of 9 Sept. 6, 1926 at Palmyra, N. J. recorded by William Yoder.

Greater Yellow-legs—Appears to be as equally abundant on the coastal salt marsh as along the fresh water river flats. Extreme dates: Feb. 25 to June 11; July 7 to Dec. 5. Largest flocks: Northbound—30 on April 15, 30 on April 29, 30 on May 2 and 60 on May 3; Southbound—50 on July 27, 73 on Aug. 15 and 42 on Oct. 19.

Lesser Yellow-legs—Prefers the fresh water flats to the salt marsh. An uncommon but regular migrant on the northward flight and one of the commonest on the southward. Extreme dates: March 21 to May 20; June 25 to Nov. 17. Largest flocks: Northbound—5 on May 4, and 4 on May 20; Southbound—250 on Aug. 1, 200 on Aug. 15 and 202 on Sept. 12.

Pectoral Sandpiper—More common along the river than along the coast since they prefer fresh water. Rare on northward but common on southward flight. Largest flocks were found where sparse vegetation grows on flats. Often found in cultivated fields. Extreme dates: April 15 to April 30; July 23 to Nov. 9. Largest flocks: Northbound—10 on April 15 and 5 on April 30; Southbound—76 on Aug. 1, 75 on Aug. 24, 100 on Aug. 27 and 80 on Sept. 4.

White-rumped Sandpiper—Prefers fresh water so is more common along the river than along the coast. Rare on northward flight, not being recorded on this survey; but is regular on southward flight. Extreme dates: Northbound, from Richard Miller—May 13, 1930 to May 26, 1931; Southbound Aug. 6 to Nov. 3. Largest flocks: Southbound—25 individuals on each of the following days: Oct. 14, 27, 28 and 31.

Baird's Sandpiper—Never recorded on northward flight. Only twice recorded on southward flight—One on Sept. 4 and 3 on Sept. 5. Shows a preference for fresh water. Julian Potter believes it to be more common along the river than on the salt marshes. His extreme dates are Aug. 26 to Sept. 21.

Least Sandpiper—Prefers the salt marsh, but is a regular migrant on the river in spring and summer. Largest flocks were found where sparse vegetation grows on the flats. Extreme dates: May 10 to May 31; July 1 to Oct. 16. Largest flocks: Northbound—12 on May 20 and 10 on May 31; Southbound—40 on July 5, 300 on Aug. 13 and 50 on Aug. 24.

Red-backed Sandpiper—Irregular spring migrant; uncommon but regular on southward flight. Shows preference for salt water, being much more common on the coast. Extreme dates: May 7 to May 28; Sept. 30 to Oct. 30. However, Richard Miller has recorded them as early as Aug. 5, 1934 on the southward flight. Largest flocks: Northbound—two on May 7 and 6 on May 28; Southbound—20 on Sept. 30 and 30 on Oct. 27.

Dowitcher—A typical bird of the salt marshes, being unusual along the river in the spring and an uncommon but regular migrant in the summer and fall. Often found associated with Lesser Yellow-legs or Stilt Sandpiper. Extreme dates: One spring record—May 24; Southbound, July 20 to Oct. 16. Additional spring records: Two on May 7, 1933 (Miller), 4 on May 14, 1935 (Miller), one on May 17, 1925 (Yoder). Largest flocks: Southbound—20 on July 23, 15 on Aug. 13 and 20 on Aug. 24.

Stilt Sandpiper—More apt to be found on the river than on the coastal marshes, since they prefer fresh water. Nearly always they were associated with Lesser Yellow-legs, occasionally with Dowitchers. Not recorded on northward flight; of regular occurrence on southward. Extreme dates: July 14 to Oct. 30. Largest flocks: 15 on Oct. 14, 12 on Oct. 17. Additional records: Two on May 14, 1935 and 2 on May 19, 1935 (Miller). 36 on Sept. 17, 1932 (Potter), 50 on Sept. 21, 1932 (Potter), 50 Sept. 4, 1933 (Potter). This data suggests that additional observations would change the peak of southward migration as shown in Figure 2 from late October to late September.

Semipalmated Sandpiper—This is certainly the most abundant shore bird in this region, for flocks of two or three thousand are common along the river during late July and early August. A flock of 25,000 was recorded which is more than twice the total of all other shorebirds for ten years! While the species is found in larger flocks on the river, they do not linger in any numbers as they do on the coastal salt marsh. Extreme dates: May 7 to June 5; July 15 to Nov. 7. Largest flocks: Northbound—100 on May 22, 150 on May 24 and 400 on May 31; Southbound—2,800 on July 23, 25,000 on July 28, 3,000 on Aug. 1 and 3,000 on Aug. 22.

Western Sandpiper—Rare on northward flight, being recorded only twice; regular in the fall. Occasionally found in unmixed flocks but usually associated with Semipalmated Sandpipers. Probably prefers salt water. Extreme dates: May 14 to May 20; Aug. 15 to Nov. 23. Richard Miller reports 6 as early as Aug. 5, 1934. Largest flocks: Northbound—one on May 14, 2 on May 20; Southbound—60 on Aug. 22, 50 on Sept. 22, 30 on Sept. 30 and 50 on Oct. 19.

Hudsonian Godwit—Recorded once, 3 on Sept. 8, 1936 at Richmond, Philadelphia, Pa., by Richard Miller. Witmer Stone, *Bird Studies at Old Cape May*, Vol. I, page 500, mentions two old records from Philadelphia; a specimen in the Philadelphia Academy from the Delaware River, from Dr. S. W. Woodhouse and a record of one shot by C. D. Wood on the Schuylkill River below Philadelphia in September 1878.

Sanderling—Strictly a salt water species that is occasionally seen along the river during the southward flight. When found, it is usually along the edge of a dike where it is sandy or firm, rather than in the soft mud frequented by most species. Although only recorded 3 times during this survey, there were 4 previous records in *Cassinia*, and also between 1931 and 1934, 2 from Richard Miller and one from Julian Potter. Extreme dates: Aug. 5, 1934 to Oct. 20, 1937. Largest flocks: 15 on Aug. 5, 1934, 6 on each of the following days; Sept. 15, 17 and 21, 1932.

Avocet—An unusual southward migrant that was reported on the fill at Fort Mott in the falls of 1938 and 1941. However, it was recorded only once on this survey, 7 on Nov. 16, 1941. Shows a preference for fresh water so is more apt to be found in the future along the river than along the coast. During the fall of 1938 they lingered on the fill from Oct. 1 to Nov. 13, *Cassinia*, 1938 to 1941, page 47. The largest flock was 12 on Nov. 2, 1941, recorded by J. Rigby, *Cassinia*, 1942, page 47.

Wilson's Phalarope—An unusual migrant, only being recorded twice on this survey; one on Sept. 30, 1945 at Westville, N. J. and 9 on Oct. 31, 1943 at Fish House cove. Additional records: One female in breeding plumage on May 20, 1911 at Frankford, Philadelphia, Pa.; one on Sept. 2, 1929 and one on Sept. 15, 1929 at West Collingswood, N. J., recorded by Julian Potter; one on Oct. 11, 1936 at Fort Mott, Stone, *Bird Studies at Old Cape May*, Vol. I, page 520 (Potter).

*SPECIES OCCURRING ALONG THE DELAWARE BUT NOT
RECORDED IN THIS SURVEY*

Knot—Two records, probably the same bird; two Aug. 18, 1928 and one Aug. 21, 1928 at Richmond, Philadelphia, Pa., observed by Richard Miller.

Black-necked Stilt—One Sept. 28, 1938, at Glenolden, Pa., by Carl Larop, *Cassinia*, 1938 to 1941, page 44.

Red Phalarope—Two records slightly outside of the area of this survey; one collected Dec. 15, 1918 at George School by Cocks; one collected about Dec. 15, 1918 at Lenape, Chester Co., Pa. by Ehinger, *Cassinia*, 1919, page 31.

Northern Phalarope—One killed along the Delaware River in the spring of 1892, *Cassinia*, 1903, page 52; one collected May 22, 1910 on the river below Philadelphia by Charles Liebeck, *Cassinia*, 1911, page 63; two Aug. 13, 1917 at Camden, N. J. by Potter, *Cassinia*, 1917, page 47; one May 30, 1933 at Camden, N. J. by Tatum, *Cassinia*, 1933 to 1937, page 11; one recorded Sept. 18, 1941 at Fort Mott, N. J. by J. Cadbury, *Cassinia*, 1938 to 1941, page 50; one reported Sept. 22, 1943 at West Chester Reservoir, Pa. by Whitworth, *Cassinia*, 1943, page 32.